JSA NUMBER: JSA-012 **Revision No:** 2 **ORIGINAL:** 12/06/05 **REVISION:** 2/23/07	**Company Performing the Job:** Brown and Caldwell / Subcontractors	**PROJECT MANAGER:** Chuck Zimmerman **SAFETY OFFICER:** Penny Bassett
JOB TITLE OR TASK: Low-Flow Groundwater Sampling	**TITLE OF PERSON(S) WHO PERFORMS JOB:** Site Manager: TBD Site Technicians: TBD	**ANALYSIS BY:** Brian Bass, Chris Gardener **REVIEWED BY:** Penny Bassett

REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE) AND/OR PERTINENT JOB SAFETY FORMS:

Minimum PPE: Hard hat, safety glasses, steel-toed boots, long-sleeved shirt, high visibility vest.
Additional PPE (as needed): Leather gloves, nitrile gloves, face shield.
Monitoring Equipment: pH meter, water level indicator
Job Safety Form: BP Authorization to Work, Tailgate Meeting Record

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	PREVENTIVE OR CORRECTIVE ACTION
1. Pre-Construction Safety Meeting.		1. All employees assigned to this task will attend a pre-construction safety meeting, which will include the pertinent JSAs, Standard Operating Procedures, types of potential hazards, and actual hazards present and controls for those hazards.
2. Installation of development pump a. Connect pump to security cable and sample tubing. b. Lower pump to desired depth in well. c. Turn pump on and monitor flow rate, pumped volume and water turbidity. d. Turn pump off and remove from well.	1. If installed by hand, potential hand injuries 2. Physical hazards associated with manual lifting and carrying of machinery parts.	1. Driller's helpers will assist each other when lowering and pulling the pump. If available, a reel and pulley or wire line system will be utilized to raise and lower well pumps. 2. Wear leather gloves. Lift heavy objects using the legs and not the back. Use wheeled transport equipment for heavy loads.Keep hands away from potential pinch points during handling. Wear steel toe boots.
3. Calibration of monitoring equipment a. Pour calibration solution into clean cup. b. Place probe in solution until parameters are stable. c. Adjust monitor as required.	1. Skin or eye contact with calibration chemicals	1. Wear disposable gloves and safety glasses, avoid direct contact with calibration solutions. 2. Properly dispose of calibration solution wastes.
4. Set up and installation of low-flow pump a. Connect low-flow pump to sampling tube and security cable. b. Lower pump into well. c. Connect sampling tube to pump controller and flow cell. d. Connect pump controller to pressurized gas cylinder (nitrogen) or air compressor with appropriate pressure regulator. e. Open regulator valve and adjust pump controller to achieve desired flow rate	1. If installed by hand, potential hand injuries 2. Physical hazards associated with manual lifting and carrying of gas cylinders or other heavy equipment. 3. Unexpected release of pressure form gas cylinder or air compressor.	1. Two people should assist each other at the well when lowering and pulling the pump and packer assembly, wear leather gloves. 2. Lift heavy objects using the legs and not the back. Use wheeled transport equipment for heavy loads. Get assistance when handling loads greater than 50 lbs. 3. Cylinder must be secured in a stable vertical position before pressure regulator is attached. Remove regulator and replace cap when transporting cylinders. Check for damaged air lines and replace if compromised.
5. Sample collection a. Monitor water parameters until stabilized. b. Prepare sample bottles with preservatives and labels. c. Collect water sample from discharge tubing into sample bottles.	1. Contact with potentially contaminated groundwater 2. Contact with and burns from acids used for sample preservation	1. Wear disposable gloves and safety glasses when collecting sample to minimize contact with groundwater. 2. Wear disposable gloves and safety glasses or goggles when handling acids. Quantities handled are generally very small, so large spills are unlikely. In event of contact with acid, wash area thoroughly with fresh water.

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d. Securely cap containers and store in sample cooler until shipping.	3. Tripping potential on air/sample discharge line. 4. Back strain when transporting coolers full of collected samples.	3. Organize line to keep out of way as much as possible, mark potential tripping hazards with caution tape or safety cones. 4. Use proper lifting techniques. Get assistance when possible, especially for containers heavier then 50 lbs.
6. Sample collection a. Place samples in shipping cooler, ensuring containers are protected from breakage. b. Place bagged ice in cooler if required. c. Place chain of custody or other shipping papers in cooler. d. Seal cooler with packing tape and label for shipment. e. Deliver to shipping outlet or lab or request pick-up.	1. Back strain when transporting coolers full of collected samples.	1. Use proper lifting techniques. Get assistance when possible, especially for containers heavier then 50 lbs.
7. All Activities	1. Slips, Trips, and Falls 2. Hand injuries during manual handling of materials. 3. Foot injuries 4. Back injuries	1. All personnel should be constantly watching for trip hazards such as uneven terrain, holes, ditches, stretched wires or ropes, or any other materials or pieces of equipment in their path. 2. Significant below-grade hazards (e.g., holes or trenches) should be marked with flagging, fencing or other appropriate means to make the obstacle easily identifiable. 3. Footwear appropriate for the terrain and work to be performed must be worn. 4. Muddy, snowy, and icy conditions will warrant a more cautious work attitude. Employees should change work speed and style to fit the weather conditions. 5. Workers should inspect materials for slivers, jagged or sharp edges, and rough or slippery surfaces. 6. Workers should keep fingers away from pinch and shear points, especially when setting down materials. 7. Workers should wipe off greasy, wet, slippery, or dirty objects before attempting to handle them. 4. In most cases, gloves or other protection should be used to prevent hand injuries. 5. Steel-toed bots should be used for protection of the feet. 6. All three main factors in manual lifting (load location, task repetition, and load weight) must be considered when evaluating what is safe or unsafe to lift. 7. All manual handling of heavy or bulky objects should be carefully planned to avoid injuries and damage to equipment.
8. Unsafe conditions.	1. All potential hazards.	1. Where a situation presents a hazardous condition, the exposed employee will be removed from the hazardous area until all necessary precautions have been taken to eliminate the hazard and ensure their safety.

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